Novel Fiber-Optic Cable Design to Facilitate Substantially Greater Bandwidth with Nano-crawlspaces for Polarized Light Rather than Spherical Optical Channels

28 August 2024
Simon Edwards
Research Acceleration Initiative

Introduction

Improvements to the maximum possible bandwidth achievable through fiber-optic transmission fit into two broad categories: Those which do not require fiber-optic cable to be upgraded and those which do. Improvements of both types certainly each have a great deal of potential. Under the category of those improvements which do not require replacement of extant cables, this author's own 2022 proposal recommending that a dimension of amplitude modulation be added to the transmission protocol can, in and of itself, yield a 200-fold increase to maximum bandwidth. This, I specified, is achievable provided that the protocol used is modified so that light is amplified at the relay level not to some pre-defined maximum value, but rather, in such a way that subtle differences in the original amplitude of the light are preserved with the relays being used to instead increase amplitude by some proportional value. While each specific pathway taken by light between any two networked computers would result in a unique degree of degradation of light, once a baseline is established, such a protocol would prove useful for increasing effective bandwidth.

The inability to usefully convey light of different frequencies through the same circular fiber is a source of ongoing frustration for researchers. This has not prevented researchers from attempting this approach. Unfortunately, there is no way to convey light at multiple frequencies in parallel with one another without phase cancellative effects corrupting the signal.

Abstract

Fiber-optic cables, as they exist today, consist of channels which are far wider than what is truly necessary to support the transmission of light. The smallest possible channel must merely be at least as wide as the phase height of a waveform. Not only may these fibers be made to be smaller in diameter, more individual light channels may be packed into a given space provided that the use of nanoscopic channels which are rectangular in shape are employed and are made to carry polarized light (more like a sword in a sheath than arrows in a quiver.) Polarized light takes up very little space and provided that its path may be constrained to extremely slender channels, it can be prevented from interfering with other polarized beams of different frequencies traveling in extreme proximity.

At the end of the fiber, it would not be necessary for a signal processor to have separate detectors for each of these channels as a single detector capable of differentiating between the variant frequencies could interpret the data.

Conclusion

The potential for increases to maximum bandwidth would be quite extraordinary. Technologies such as the highly efficient LED mechanism described in 29 November 2023 would prove invaluable as this technique of projecting electron triplets toward singlets in a controlled manner would enable hyperlocalized photon emission capable of supporting the aforementioned system.